10D-RTD4

Linearized 4-Wire RTD Input, Analog-Sensor-to-Digital Front End Signal Conditioner

DESCRIPTION

10D-RTD4 linearized temperature input modules are designed to interface with 4-wire Pt100 sensors used in industrial, test, and measurement applications.

Each module provides a single channel of temperature input that is filtered, isolated, amplified, and converted into 24-bit digital data for precise measurement of temperature signals.

RTD excitation is provided by the module using a precision current source. Excitation current does not flow in the input signal leads, which allows RTD measurements to be made independently of lead resistance. Low excitation current (250µA) minimizes self-heating of the RTD, further reducing measurement errors.

Discrete output pins can be mapped to configurable low and high alarms to provide essential monitoring and warning functions to ensure optimum process flow and fail-safe operation.

Input-to-digital isolation is rated at a robust 1500Vrms and all field-side inputs are protected against accidental power-line connections up to 240Vrms. These features safeguard measurement and control equipment from the harmful effects of signal noise, transient surges, ground loops, and other industrial hazards.

Over-range and under-range up to 10% beyond specified input values are supported with accuracy guaranteed to ±full-scale. All 10D modules are housed in rugged thermoplastic packages and are specified to operate over the industrial temperature range of –40°C to +85°C.

FEATURES

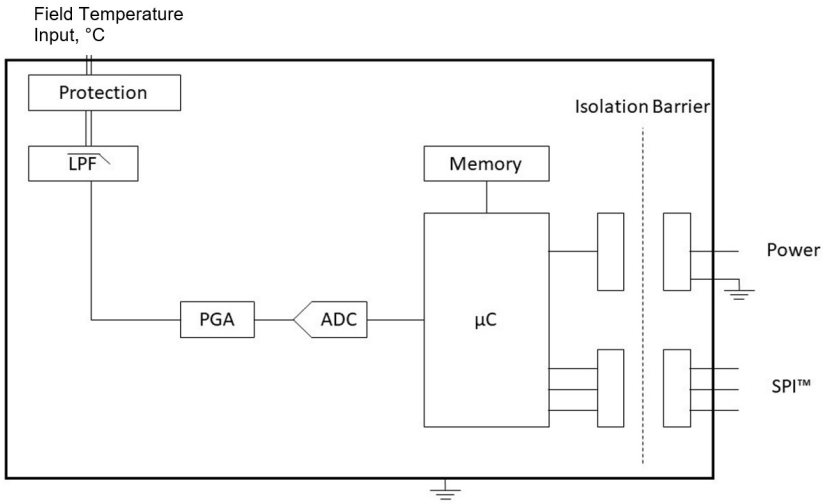
- Interface to 100Ω Platinum RTDs
- 1 Input Channel
- Configurable for Alarms and Averaging
- Linearizes RTD Signals
- 1500Vrms Input-to-Digital Isolation
- Input Protected up to 240Vrms
- CE Compliant
- 24-Bit Resolution
- Operating Temperature: –40°C to +85°C

BENEFITS

- Small footprint
- Simplifies Sensor Interface and Signal Conditioning Design
- Reduces System BOM
- Provides Isolation of External Sensors
- Protects Sensitive System Components
- Breaks Ground Loops
- Reduces EMC Concerns

APPLICATIONS

- Signal Conditioning
- Signal Isolation
- Signal Filtering
- Industrial Process Control
- Test and Measurement
- System and Signal Monitoring



10D-RTD4 Block Diagram

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Preliminary

Specifications

Typical* at T_A = +25°C and +3.3VDC power

Module	10D-RTD4-xxx-xx
10D-RTD4-xxx-xx	1-channel Pt100 RTD Input
Input Range	See Ordering Information
Input Protection	
Continuous(1)	240Vrms (max)
Transient	EN61000-6-2
Sensor Excitation Current	250µA
Lead Resistance Effect	±0.005°C/Ω(2)
CMV	
Input-to-Digital	1500Vrms (max)
Transient	EN61000-6-2
CMR (50Hz or 60Hz)	120dB
NMR	40dB/decade
Accuracy	See Ordering Information
Stability	
Offset	±20 ppm/°C
Gain	±50 ppm/°C
Bandwidth, -3dB	3Hz
Sampling Rate	2000 S/s
Alarms	Low, High
Open Input Response	Upscale
ADC Resolution	24-bit
Discrete Inputs	1
Discrete Outputs	2
Discrete Output Drive Current	4mA
Interface	SPI(4)
Clock Input	1MHz (max)
SPI Mode	1
Bit Order	MSB First
Power Supply Voltage	+3.0 to +5.25VDC
Power Supply Current	52mA
Mechanical Dimensions (h)(w)(d)	0.350" x 2.00" x 1.00" (8.89mm x 50.8mm x 25.4mm)
Environmental	
Operating Temp. Range	–40°C to +85°C
Storage Temp. Range	–40°C to +85°C
Relative Humidity	0 to 95% Noncondensing
Emissions EN61000-6-4	ISM, Group 1 Class A
Radiated, Conducted Immunity EN61000-6-2	ISM, Group 1
RF	Performance A ±0.5% Span Error
ESD, EFT	Performance B

Ordering Information

Model	Input Range	Output	Accuracy(3)	
10D-RTD4-1H1-01	-200°C to +850°C	SPI	±0.03	±0.32°C
10D-RTD4-1H1-02	-200°C to +395°C	SPI	±0.03	±0.18°C
10D-RTD4-1H1-03	-179°C to +191°C	SPI	±0.03	±0.11°C
10D-RTD4-1H1-04	-92°C to +94°C	SPI	±0.03	±0.06°C

RTD Standards

Type	Alpha Coefficient	DIN	JIS	IEC
100Ω Pt	0.00385	DIN 43760	JIS C 1604-1989	IEC751

NOTES:
*Contact factory or your local Dataforth sales office for maximum values.
(1) 240Vrms between +IN and -IN, +EXC, or -EXC pins.
120Vrms between -IN and +EXC, or -EXC pins.
120Vrms between +EXC and -EXC pins.
(2) "Ω" refers to the resistance in one lead.
(3) Includes linearity/conformity, hysteresis, and repeatability.
(4) Refer to timing diagram in user manual.

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